



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005GA74B

Title: A strontium isotope investigation of possible sewage influx to stream base flow in the Atlanta metropolitan region

Project Type: Research

Focus Categories: Hydrogeochemistry, Hydrology, Geochemical Processes

Keywords: base flow, sewage pipe leakage, Atlanta metropolitan region, strontium isotopes, urban hydrology, Chattahoochee River basin

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: \$18,000

Non-Federal Matching Funds: \$43,036

Congressional District: 5th

Principal Investigator:

Seth E. Rose

Abstract

The purpose of the proposed investigation is determine how strontium isotope systematics (i.e. Sr-87/Sr-86 ratios and Sr ion concentrations) can be utilized to interpret the extent to which leaky sewage pipes have contaminated stream base flow (ground water) in the Atlanta metropolitan region(Chattahoochee River basin). Strontium isotope ratios were previously identified as the most diagnostic "tracer" of natural waters in Georgia Piedmont watersheds and the proposed study will build upon this research. Strontium concentration and Sr isotope ratios will likely be higher in sewage- impacted ground water and base flow than in unimpacted Piedmont watersheds. A sampling protocol and statistical methodology will be developed to assess the significance of differences between "natural watersheds", streams with CSO facilities, and stream basins in proximity to buried sewage lines. Correlation and R-mode factor analysis will be used to assess relationships between Sr concentrations and isotopic ratios with major ion parameters. Environmental isotopes will be used to estimate the residence time of ground water and seasonal influxes. Hysteresis analyses will be used to analyze mixing dynamics that occur during and after storms in both impacted and non-impacted basins.